

## **Historic, archived document**

Do not assume content reflects current scientific knowledge, policies, or practices.



# TECHNICAL NOTES

## LAKE STATES FOREST EXPERIMENT STATION U.S. DEPARTMENT OF AGRICULTURE • FOREST SERVICE

No. 617

### Sprouting of Northern Oaks Reduced After Debarking With Sodium Arsenite

Sodium arsenite applied to cut-bark treatments usually gives excellent topkill in northern oaks and is an effective bark-loosening agent (Technical Note 445) in the utilization of these species for pulpwood. A followup study of the effect on sprouting 6 growing seasons after treatment showed a significant reduction in the percentage of stumps sprouting and the number of sprouts per stump (fig. 1).

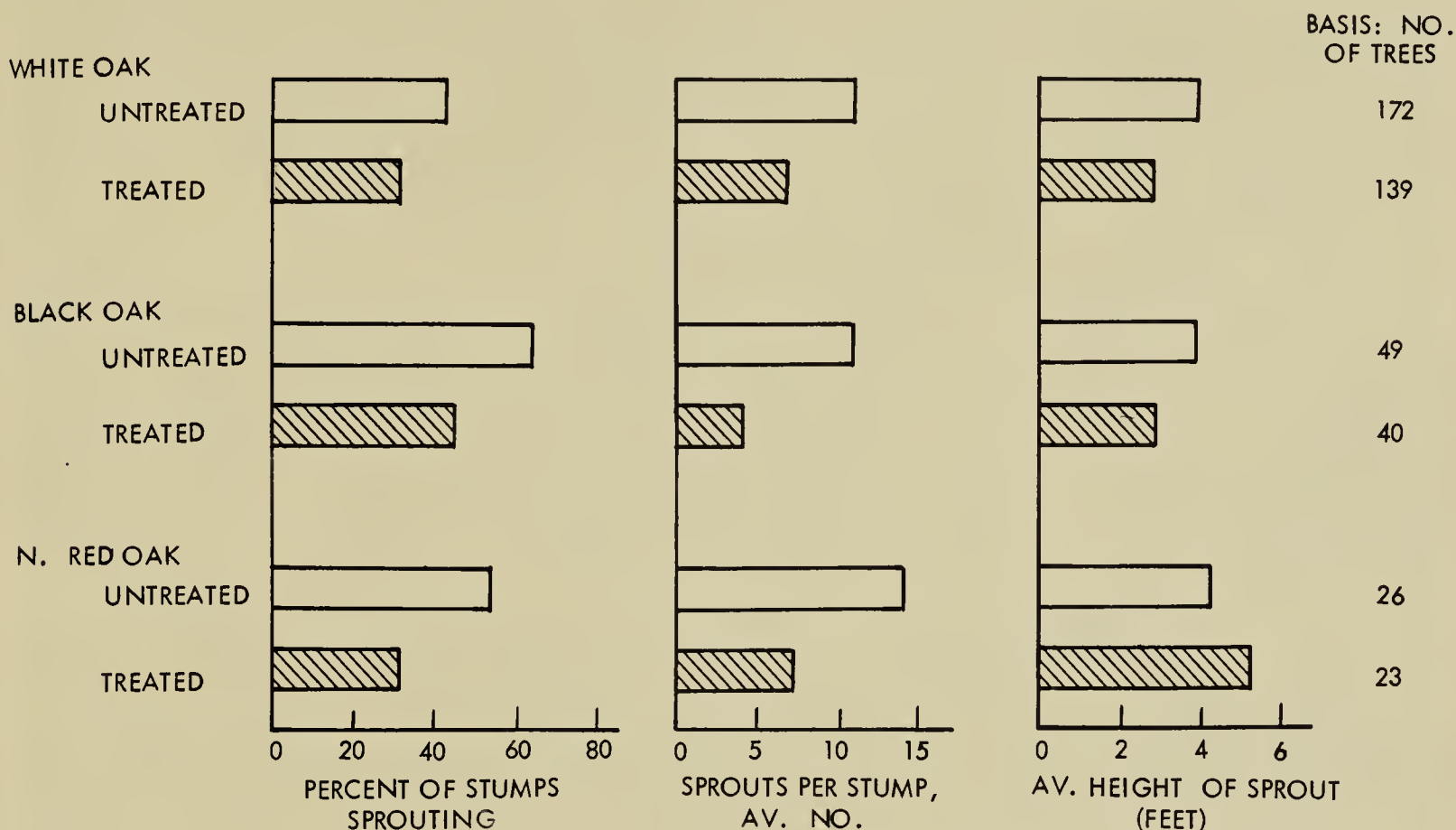


Figure 1.--Sprouting characteristics of northern oak species 5 years after debarking with sodium arsenite.

The tests were established in a northern oak stand growing on Grayling sand in the Pine River Experimental Forest, Wexford County, Mich. In early June 1955 all trees 5.0 inches d.b.h. and larger on four 2½-acre compartments were treated with a 40-percent solution of sodium arsenite. The chemical was applied at stump height with a 4-inch brush in a barked zone between two full girdles. The barked zone was as wide as the tree d.b.h. These trees and 10 acres of untreated trees were felled the following spring and early summer. The volume yield averaged 1,000 board feet and 10 cords of pulpwood per acre.

Species composition of the stand included: white oak, 57 percent; northern red oak, 24 percent; and black oak, including a small amount of northern pin oak, 16 percent of the merchantable stand basal area. Red maple and bigtooth aspen made up the remaining 3 percent of the basal area. Stand age ranged from 58 to 70 years and total height from 50 to 70 feet. Merchantable trees, those 5.0 inches and larger, averaged 136 per acre with 54 square feet of basal area. Smaller trees averaged 275 per acre with 11 square feet of basal area.

The sodium arsenite treatment resulted in a reduction from the expected number of trees sprouting for each species; the reduction was significant at the 1-percent level. This effect of treatment had occurred by the end of the first full growing season--approximately the same percentage of stumps were sprouting then as at the end of 6 growing seasons after treatment.

The greatest reduction in percentage of trees sprouting was in red oak (23 percent), and the smallest in white oak (12 percent). Black oak had the highest percentage of stumps sprouting, averaging 65 and 45 percent for untreated and treated trees, respectively, and white oak the least with 44 and 32 percent, indicating the species difference in sprouting vigor.

Tree diameters, which were regularly distributed from 5 to 15 inches, did not show a consistent relationship to the percentage of trees sprouting. If trees less than 5 inches in diameter had been cut, the percentage of sprouting would probably have shown a stronger correlation with stump size.

The difference in number of sprouts per stump between the treated and untreated trees for the three oak species was highly significant. On untreated trees, averaging 13 sprouts per stump, the number of sprouts tended to increase with tree size. On treated trees, which averaged eight sprouts per stump, the larger sizes had the fewest number of sprouts. The average height of sprouts on chemically treated trees was not significantly different from those of untreated trees after adjusting the height to the same total age.

The effect of sodium arsenite treatment thus shows a generally consistent reduction in the sprouting of the three principal oak species. Within species considerable variation did occur, which may be due in part to variations in depth of frill and amount of chemical applied in each girdle on the chemically treated trees and to the stage of leaf development at time of cutting on the untreated trees.

Where conversion of the northern oak type to coniferous plantations is planned, this treatment would give some reduction in sprouting during the critical establishment period. Although release work may be needed, since one-third of the stumps are now sprouting, it could be delayed until the diameter and height growth of the conifers would show a greater response and minimize the need for additional release.